

What is claimed is:

1. A method of concentrating a material comprising at least a first component and a second component, to form a product having an increased concentration of one of the first and second component. said method comprising:
- (a) cooling at least a portion of the material to a temperature at or below the melting point of the material, said portion containing the first component in liquid phase;
- (b) applying ultrasonic energy to at least the cooled portion of the material to form a solid phase comprising said first component; and
- (c) collecting said solid phase.
2. The method of Claim 1, wherein said steps of cooling and applying ultrasonic energy comprise passing the material adjacent a first sonified cooling plate.
3. The method of Claim 2, wherein said steps of cooling and applying ultrasonic energy comprise passing the material between first and second cooling plates, at least the first cooling plate comprising a sonified cooling plate.
4. The method of Claim 3, wherein said first and second cooling plates each comprise sonified cooling plates.
5. The method of Claim 1, wherein said material comprises an aqueous material and said first component comprises water, and wherein said cooling step comprises cooling at least a portion of the aqueous material to below 0°C.

6. The method of Claim 1, further comprising depositing the material into a thin walled flexible container, said container comprising , and wherein the steps of cooling and application of ultrasonic energy are carried out across a wall portion of the flexible container.

5 7. The method of Claim 1, wherein said step of removing said solid phase comprises centrifuging the material containing said solid phase.

8. The method of Claim 1, further comprising removing salts from the material.

10 9 The method of Claim 8, wherein said step of removing salts from the material comprises effecting a transfer of salts across a dialysis membrane.

15 10. The method of Claim 1, further comprising monitoring the concentration of at least one component in said product.

11. The method of Claim 10, wherein said step of monitoring the concentration comprises sensing the resistivity of said product.

20 12. The method of Claim 10, wherein said step of monitoring the concentration comprises sensing the viscosity or optical properties of said product.

13. The method of Claim 1, further comprising testing for the presence of

one or more contaminants in said product.

14. A system for concentrating a material comprising at least a first component and a second component, to form a product having an increased concentration of one of the first and second components, said system comprising:

5 (a) a heat transfer device for cooling at least a portion of said material to a temperature at or below the melting point of said material, said portion containing said first component in liquid phase;

(b) an ultrasonic energy source for applying ultrasonic energy to at least the cooled portion of said material to form a solid phase comprising said first component; and

10 (c) means for collecting said solid phase.

15 15. The system of Claim 14, wherein said heat transfer device comprises a first cooling plate.

16. The system of Claim 15, wherein said first cooling plate comprises a transducer element of said ultrasonic energy source.

20 17. The system of Claim 15, further comprising means for passing at least a portion of the material along a surface of the at least one cooling plate.

18. The system of Claim 16, wherein said heat transfer device comprises first and second cooling plates, and wherein said system further comprises means for

passing the material between said first and second cooling plates.

19. The system of Claim 18, wherein said first and second cooling plates each comprise transducers of said ultrasonic energy source.

20. The system of Claim 14, further comprising a thin-walled flexible container for containing the material during application of ultrasonic energy.

21. The system of Claim 20, wherein said thin-walled flexible container comprises a filter element.

22. The system of Claim 14, wherein said means for collecting comprises a centrifuge.

23. The system of Claim 14, further comprising a dialysis material for removing salts from said product.

24. The system of Claim 14, further comprising a sensor for detecting the concentration of at least one component of said product.

25. The system of Claim 14, further comprising means for detecting the presence of one or more contaminants in said product.

26. A container for containing a material during separation of a first

component of the material to form a product having an increased concentration of a second component of the material, said container comprising:

(a) a flexible wall portion enclosing a treatment chamber for allowing heat transfer between an external heat transfer device and said material, and allowing ultrasonic energy transmission from an external energy source into said material;

(b) a collection chamber for collecting a removed portion of the first component; and

(c) a product chamber for collecting said product.

27. The container of Claim 26, further comprising a filter between said treatment chamber and said product chamber.

28. The container of Claim 26, further comprising a sensor for detecting the concentration of a component of the concentrated product.

29. The container of Claim 26, wherein said sensor comprises a resistive sensor for detecting the concentration of a salt within the concentrated product.

30. A method of removing water from an aqueous material to concentrate non-water components of the aqueous material, said method comprising:

(a) cooling at least a portion of the aqueous material to a temperature at or below 0°C;

(b) applying ultrasonic energy to the aqueous material to form ice crystals; and

- (c) removing the ice crystals from the aqueous material to form a product.

31. A system for removing water from an aqueous material to form a product having an increased concentration of non-water components, said system comprising:

- 5 (a) a heat transfer device for cooling at least a portion of the aqueous material to a temperature at or below 0°C;
- (b) an ultrasonic energy source for applying ultrasonic energy to at least the cooled portion of the aqueous material to form ice crystals; and
- (c) means for collecting the ice crystals from the aqueous material to form
- 10 the product.

32. A method for processing a blood plasma concentrate, comprising:

- (a) cooling at least a portion of a blood plasma concentrate to a temperature sufficient to form a system comprising a solid phase and a liquid phase;
- 15 and
- (b) separating said solid phase from said liquid phase.

33. A method for processing blood plasma, comprising:

- (a) cooling at least a portion of a blood plasma to a temperature sufficient
- 20 to form a system comprising a solid phase and a liquid phase; and
- (b) applying ultrasonic energy to at least the cooled portion of said blood plasma, to obtain a system comprising a solid phase and a liquid phase; and
- (c) separating said solid phase from said liquid phase.

34. A container for processing blood plasma by cryoprecipitation, said container comprising:

(a) a flexible wall portion enclosing a treatment chamber for allowing heat transfer between an external heat transfer device and the material, and allowing ultrasonic energy transmission from an external energy source into the material;

(b) a collection chamber for collecting a removed portion of the first component; and

(c) a product chamber for collecting the product.

35. A method for processing a temperature-sensitive material, which comprises:

(a) eluting said material through a stationary phase, while supplying ultrasonic energy ultrasonic energy transmission from an external energy source to the material.

36. The method of Claim 35, wherein said temperature-sensitive material is blood plasma or a blood plasma concentrate.

37. A method for processing a blood plasma concentrate, which comprises:

(a) eluting said blood plasma concentrate through a stationary phase.

38. The method of Claim 37, wherein said eluting is carried out while supplying ultrasonic energy ultrasonic energy transmission from an external energy

source to the material.

39. An apparatus for processing a temperature-sensitive material, which comprises:

(a) a container suitable for eluting said material through a stationary phase and allowing ultrasonic energy transmission from an external energy source into the material; and

(b) an external ultrasonic energy source.